

Using Cat Swarm Optimization in a reservoir operation problem

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Abstract

Water resources optimization problems are usually complex and hard to solve using the ordinary optimization methods, or they are at least not economically efficient. In this paper, Cat Swarm Optimization strategy has been adopted to obtain the optimal solution of a reservoir operation problem. For this purpose data from a reservoir in Iran has been used to examine the performance of the model. The results are compared with those of other heuristic optimization algorithms. It shows that the CSO algorithm can obtain a near optimal solution with less computation time and therefore is a promising method in reservoir system applications.

Keywords : Cat Swarm Optimization, Metaheuristic methods, Optimization, Reservoir operation

1 Introduction

Meta-Heuristic methods are a sub-class of Monte Carlo algorithms that often work population-based or physical process as heuristic function (Weise, 2007). Some examples of well-known meta-heuristic methods include Simulated Annealing (SA), Tabu Search (TS), Genetic Algorithms (GA), Evolutionary Algorithms (EA), Evolution Strategy (ES), Ant Colony Optimization (ACO) and Particle Swarm Optimization (PSO).

In recent years has continued the trend to provide new meta-heuristic methods based on natural systems. Therefore expected in the coming years, is proposed new methods for optimization and intelligent control using natural systems.

The cat swarm optimization (CSO) is a population based algorithm and is initially proposed by Shu-Chuan Chu et al., in 2006, for solving optimization problems. The CSO algorithm inspired by the behavior of cats. Chu et al., successfully applied CSO algorithm in several benchmark optimization problems. This research shows that CSO algorithm has better performance compared to the other heuristic optimization algorithms: Particle Swarm Optimization (PSO) and weighted-PSO in the cases of function minimization (chu et al., 2006).

Santosa and Ningrum a new CSO algorithm for clustering problem proposed. They tested new CSO clustering algorithm on four different databases. Then, the accuracy level of proposed